

MANTLE: An investigation of the non-text elements included in Social Studies Textbooks

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Abstract

The textbook is often a primary resource for teachers in elementary content areas, and it is often used to the exclusion of other resources. Research indicates that students may not have sufficient exposure to elements of nonfiction texts in order to be successful when encountering them in the content area. For many years, there has been little attention paid to teaching students to understand and interpret the visual images. The benefits of learning to understand visual images extend beyond the classroom into daily interaction with text and media. For the purpose of this study, Texas State-approved textbooks for Social Studies for Grade 1-5 from three textbook publishers selected were selected. A descriptive content analysis was used to collect information about the graphs, charts, and tables, and analyzed using frequency counts. Conclusions drawn from this study indicate there is a need to add more non-text elements in Social Studies textbooks.

In many classrooms, teachers use the textbook as the primary source of content they want their students to learn. According to research (Armbruster, Anderson, Illinois Univ., & Bolt, 1981; Chall & Conard, 1991), the textbook is the primary instructional tool in the current American educational system. The primary purpose of the textbook is to summarize and deliver knowledge for the various subjects students study. Additionally, textbooks frequently cover large amounts of unfamiliar information in lengthy passages that may be overwhelming to students. As Duke (2000) points out, it is common practice in elementary classrooms for students to interact and read fiction more frequently than nonfiction text; thus, students are often more comfortable reading fiction than nonfiction text (Gersten, Fuchs, Williams, & Baker, 2001). Students are more familiar with elements of fiction and how those elements are used than those of nonfiction texts. This lack of familiarity with nonfiction text creates problems for students as they progress through the grades and are expected to read more nonfiction text, which is frequently found in textbooks.

Research indicates that students may not have sufficient exposure to elements of nonfiction texts in order to be successful when encountering them in the content area. Van Dyke and White (2004) stated that entering college students do not have the skills to interpret graphs and provide specific steps to teach students how to understand graphs. In addition, research conducted by Murphy and Garrett (2010) indicated that students in sixth grade were unable to accurately interpret information presented on graphs found in a fifth-grade, Texas State-adopted Social Studies textbook.

The purpose of this investigation was to determine the types and quantities of graphs, charts, and tables used in Texas State-approved textbooks for Social Studies in Grade 1-5.

Review of Literature

Graphs, Charts, and Tables as Visual Literacy

According to Kress (2003), in his book *Literacy in the New Media Age*, literacy is not just the reading of the printed word. The definition of literacy must be widened to include the ability to read and understand images. In Kress's view, two logics, that of the written word and that of images, are brought together.

In order for visual images to have meaning, one must be able to decode them. For many years, elementary reading education has focused on the skills and strategies necessary for teaching students to understand the written word. There has been little attention paid to teaching students to understand and interpret the visual images, which have begun to dominate modern society (Kress, 2003). If visual literacy is to be considered a form of communication, then one needs to understand how to communicate in this language. This includes not only being aware of visual messages, but also being able to critically interpret the message embedded in the image (Emery & Flood, 1997).

Graphs, Charts, and Tables in Social Studies Textbooks

In an early study of what researchers (Kamm, Askov, & Klumb, 1977), termed "study skills" attainment, students in grades six, nine, and 12 were evaluated in terms of their ability to use reference sources, maps, graphs, and tables to locate information. The results of this study, though not definitive, seemed to indicate that students do not have the skills necessary to appropriately interpret information from these graphic representations.

In other research, DuPlass (1996), examined instructional strategies for teaching charts, tables, graphs, and diagrams in social studies. DuPlass supported the need for teachers to provide instruction for these graphic images based upon the increasing use of graphics in newspapers and magazines resulting from new technology. DuPlass stated that incorporating the study of these

graphic elements in social studies is appropriate due to the multiple charts, tables, graphs, and diagrams found in social studies textbooks. In order to augment the lack of instruction to the teacher, DuPlass presented strategies teachers of social studies can use with students to aid them in learning to comprehend and interpret graphics in social studies.

Content Area Textbooks

According to research (Armbruster, Anderson, Illinois Univ., & Bolt, 1981; Chall & Conard, 1991), the textbook is the primary instructional tool in the current American educational system. The primary purpose of the textbook is to summarize and deliver knowledge for the various subjects students study.

In addition, other researchers (Valverde, Bianchi, Wolfe, Schmidt, & Houang, 2002), have concluded that the use of textbooks in the United States has a greater effect on instruction than in other parts of the world. In a California study, Harris (2002) found that the use of textbooks was the predominant method of instruction in the core content areas in elementary classrooms. The survey results showed that teachers used the textbook for instruction 95% of the time in science, 94% of the time in math, 94% of the time in social studies, and 93% of the time in English. In another study of K-12 teachers conducted by Spor and Schneider (1999), 50% of the teachers surveyed identified textbooks as the material they used most often when planning lessons.

As a primary source of information for content areas, content area textbooks are key to lesson planning and instruction (Howe, Grierson, & Richmond, 1997). Textbooks are designed to introduce content information systematically in a sequential manner, as well as to provide teachers a framework for planning instruction (Moore, Moore, Cunningham, & Cunningham,

2006). According to Howe, Grierson, and Richmond (1997), it is common practice for teachers to rely on textbooks as the sole source of information in content area teaching.

There are inherent drawbacks to relying solely on textbooks for content area instruction. One such drawback is that content area textbooks are often written at a level above that for which they are intended to be used (Hillerich, 1987). Tyson-Bernstein (1988), stated that textbooks also tend to be generic and superficial in the information presented on a topic, which contributes to the lack of appeal for many students when it comes to reading textbook information (Tyson-Bernstein, 1988). Finally, textbooks often contain dated material (Tyson & Woodward, 1989). Many times, ten or more years may pass between one textbook adoption period and the next. The result of this, in combination with a lag in publishers including timely updates to materials, is a lack of relevant, current information.

Despite the drawbacks inherent in textbooks, Tyson and Woodward (1989) contended that the textbook is the backbone of the content area classroom, estimating 75% to 90% of classroom instruction is based upon the textbook. Considering the important role textbooks play in the content area, it is necessary that teachers provide students with meaningful strategies to enhance their comprehension of information encountered in the textbooks.

Beyond the Classroom

The benefits of learning to read, interpret, and analyze graphs, charts, and tables extend beyond the classroom into daily interaction with text and media. The world in which we live is driven by data. Individuals encounter graphs, charts, and tables in newspapers, technical manuals, magazines, television, and Internet resources (Joram, Resnick, & Gabriele, 1995). Graphs, charts, and tables are widely used today in all forms of presentation of information to make it easy for people to visualize data and compare and contrast information. According to Fry

(1983), individuals encounter many forms of graphs in both print as well as visual media. Because of this, expectations for the future of our information society include the ability to understand how surveys work, as well as what elements a good survey should contain, and the ability to correctly analyze information presented in graphical representations (Scheaffer et al., 1998).

Methods

Procedures

The researcher used descriptive content analysis to collect descriptive information about the graphs, charts, and tables. The researcher then analyzed the data collected using frequency counts.

Population

For the purpose of this study, the researcher selected Texas State-approved textbooks for Social Studies for Grade 1-5 for analysis. The researcher selected three textbook publishers for which there were social studies textbooks in Grade 1-5. The three textbook publishers selected were Addison Wesley Longman Inc., Houghton Mifflin Harcourt school publishers, and McGraw-Hill school division (contract vendor).

The editions of textbooks were selected for analysis based on the Texas State-approved textbook list and the criteria that all textbooks selected for Grade 1-5 were from the same publishers and appear in Table 1. Using all 15 of these textbooks produced a total of 301 non-text elements for examination. These non-text elements consisted of graphs, charts, and tables.

Analysis. In order to answer the research question, “What types and quantities of graphs, charts, and tables are used in Texas state-approved textbooks for Social Studies in Grade 1-5?” the researcher used descriptive content analysis to collect descriptive

information about the graphs, charts, and tables. The researcher then analyzed the data collected using frequency counts.

The researcher compared each grade level across publishers and compared each publisher across grade levels. For example, the researcher looked at Grade 1 and compared the data collected from the publishers. The researcher also compared data collected by publisher across Grades 1-5. For example, the researcher looked at Houghton Mifflin Harcourt school publishers and compared the data collected from Grade 1-5.

The Types and Quantities of Graphs, Charts, and Tables

This section presents the findings of the types and quantities of graphs, charts, and tables found in Texas state-approved textbooks for Social Studies in Grade 1-5, in order to answer the following research question: What types and quantities of graphs, charts, and tables are used in Texas state-approved textbooks for Social Studies in Grade 1-5? The data collected was organized and presented overall, by grade level, and then by publisher.

The types and quantities of graphs, charts, and tables found in Texas state-approved textbooks for Social Studies in Grade 1-5 are displayed in Table 2.

This data indicates that the type of non-text element most frequently used in Texas state-approved textbooks for Social Studies in Grade 1-5 was the *Chart*, with 39.53% of the non-text elements being Charts. The second most frequently used non-text element was the *Bar Graph*, with 23.26% of the non-text elements. *Line Graphs*, *Tables*, *Circle Graphs*, and *Pictographs* ranged between 6.31%, and 11.63% and the *Climograph* and *Population Pyramid* were used the least often accounting for 1.66% and 0.33% of the non-text elements respectively.

This information was also broken down by the types and quantities of graphs, charts, and tables at each grade level for Grade 1-5 and displayed in Figure 1 and Table 3.

As indicated by the data gathered, the overall number of non-text elements increased each year from Grade 1-5. In Grade 1, 35 non-text elements were examined. Grade 2 contained 36 non-text elements. Grade 3 increased to 53 non-text elements. Grade 4 increased to 74 non-text elements, and Grade 5 had a total of 103 non-text elements.

There were, however, variations at each grade level in the specific type of non-text element used. Only four out of the eight types of non-text elements were found at Grade 1. These were *Bar Graphs*, *Pictographs*, *Charts*, and *Tables*. The most frequently used type of non-text element in Grade 1 was the *Chart*, followed by the *Table*, then the *Pictograph*, and finally the *Bar Graph*.

In Grade 2, *Bar Graphs*, *Pictographs*, *Charts*, *Tables*, and *Circle Graphs* were used. The number of *Bar Graphs*, *Circle Graphs*, and *Charts* increased while the number of *Pictographs* and *Tables* decreased. The most frequently used type of non-text element in Grade 2 was the *Chart*, followed by the *Table*, then the *Bar Graph*. The *Circle Graph* and *Pictograph* were each used twice.

In Grade 3, *Bar Graphs*, *Pictographs*, *Charts*, *Tables*, and *Line Graphs* were used. *Circle Graphs* were used in Grade 2; however, they were not used in Grade 3. The number of *Bar Graphs*, *Line Graphs*, and *Charts* increased while the number of *Circle Graphs* and *Tables* decreased. The number of *Pictographs* remained consistent from Grade 2 to Grade 3. The most frequently used type of non-text element in Grade 3 was the *Chart*, followed by the *Line Graph*, and then the *Table*.

In Grade 4, *Bar Graphs, Circle Graphs, Climographs, Line Graphs, Pictographs, Charts,* and *Tables* were all used. The number of *Bar Graphs, Circle Graphs, Climographs, Line Graphs,* and *Pictographs* increased while the number of *Charts* decreased and *Tables* remained the same. The most frequently used kind of non-text element was the *Chart*, followed by the *Bar Graph, Line Graph* and then the *Circle Graph, Pictograph, Table,* and, finally, the *Climograph*.

In Grade 5, *Bar Graphs, Circle Graphs, Climographs, Line Graphs, Pictographs, Charts, Tables,* and *Population Pyramids* were all used. The most frequently used kind of non-text element was the *Bar Graph* followed by *Chart, Line Graph, Circle Graph, Pictograph, Table* and *Climograph*, and, finally, the *Population Pyramid*.

In Grade 1 through Grade 4, the non-text element most often used was the *Chart*. At Grade 5, the non-text element most often used was the *Bar Graph*. The *Population Pyramid* was the least used non-text element at each grade level.

This information was also broken down by the quantities of graphs, charts, and tables by publisher at each grade level for Grade 1-5. The results of this examination are presented in Table 4 for each publisher.

The Houghton Mifflin Harcourt school publishers textbooks contained the most non-text elements examined by the researcher. These textbooks also contained the most non-text elements at each grade level examined except at Grade 3. The McGraw-Hill school division textbooks contained the second most non-text elements examined by the researcher. Additionally, the McGraw-Hill school division textbook at Grade 3 contained the

most non-text elements examined. Finally, the Addison Wesley Longman Inc. textbooks contained the fewest non-text elements examined at all grade levels.

Figure 2 depicts the distribution of graphs, charts, and tables across the three publishers examined.

The Houghton Mifflin Harcourt school publishers textbooks contained the most non-text elements overall with 120 elements examined. Of all the non-text elements examined, Houghton Mifflin Harcourt school publishers contained the most *Bar Graphs* (27), *Tables* (18), *Pictographs* (13), *Climographs* (3), and *Population Pyramids* (1). These textbooks contained the fewest *Circle Graphs* (5). The McGraw-Hill school division textbooks contained the second most non-text elements overall with 102 elements examined. Of all the non-text elements examined, McGraw-Hill school division contained the most *Charts* (50) and *Line Graphs* (14). These textbooks contained the fewest *Bar Graphs* (19), *Tables* (6), and *Climographs* (0). Finally, the Addison Wesley Longman Inc. textbooks contained the fewest non-text elements overall with 79 elements examined. Of all the non-text elements examined, Addison Wesley Longman Inc. did not contain the most of any non-text element. These textbooks contained the fewest *Charts* (28), *Line Graphs* (9), and *Pictographs* (1). The McGraw-Hill school division and Addison Wesley Longman Inc. contained the same number of *Circle Graphs* (8) and *Population Pyramids* (0).

The types and quantities of graphs, charts, and tables were also examined across grade levels by each publisher. The data gathered for the McGraw-Hill school division textbooks is presented in Figure 3 and Table 5.

The data showed the overall number of non-text elements in the McGraw-Hill school division textbooks increases each year from Grade 1 through Grade 3. At Grade 4, the number of non-text elements decreased slightly, and at Grade 5, the number increased again. In Grade 1, 10 non-text elements were examined. Grade 2 contained 11 non-text elements. Grade 3 increased to

27 non-text elements. Grade 4 decreased to 26 non-text elements, and Grade 5 had a total of 28 non-text elements that were examined.

There were variations at each grade level in the specific type of non-text element used. Only three out of the eight types of non-text elements were found at Grade 1. These were *Pictographs*, *Charts*, and *Tables*. The most frequently used type of non-text element in Grade 1 was the *Chart*, followed by the *Pictograph*, then the *Table*.

In Grade 2, *Bar Graphs*, *Charts*, and *Tables* were used. The number of *Bar Graphs*, *Charts*, and *Tables* increased while the number of *Pictographs* decreased. The most frequently used type of non-text element in Grade 2 was the *Chart*, followed by the *Table*, and then the *Bar Graph*.

In Grade 3, *Bar Graphs*, *Line Graphs*, *Pictographs*, *Charts*, and *Tables* were used. The number of *Bar Graphs*, *Line Graphs*, *Pictographs*, and *Charts* increased while the number of *Tables* decreased. The most frequently used type of non-text element in Grade 3 was the *Chart*, followed by the *Bar Graph*, and *Line Graph*. The *Pictograph* and *Table* were the least used non-text elements and each was used one time.

In Grade 4, *Bar Graphs*, *Circle Graphs*, *Line Graphs*, *Pictographs*, and *Charts* were used. The number of *Bar Graphs*, *Circle Graphs*, *Climographs*, and *Line Graphs* increased while the number of *Pictographs*, *Charts*, and *Tables* decreased. The most frequently used type of non-text element in Grade 4 was the *Chart*, followed by the *Bar Graph*. The *Circle Graph* and *Line Graph* were the least used non-text elements and each was used four times.

In Grade 5, *Bar Graphs*, *Circle Graphs*, *Line Graphs*, *Pictographs*, and *Charts* were used. The most frequently used kind of non-text element was the *Chart* followed by *Line*

Graph, Bar Graph, Circle Graph, and the Pictograph. The Climograph, Table, and Population Pyramid were not used in Grade 5.

In Grade 1-5, the most often-used non-text element used was the *Chart*. *Tables* were used only in Grade 1 through 3, and the *Climograph* and *Population Pyramid* were not used at all

The data gathered for the Addison Wesley Longman Inc. textbooks is presented in Figure 4 and Table 6.

As indicated by the data gathered, the overall number of non-text elements in the Addison Wesley Longman Inc. textbooks increases each year from Grade 2 through Grade 5. From Grade 1 to Grade 2, the number of non-text elements decreased slightly. In Grade 1, 10 non-text elements were examined. Grade 2 contained nine non-text elements. Grade 3 increased to 10 non-text elements. Grade 4 increased to 16 non-text elements, and Grade 5 had a total of 34 non-text elements that were examined.

There were variations at each grade level in the specific type of non-text element used. Only three out of the eight types of non-text elements were found at Grade 1. These were *Bar Graphs, Charts, and Tables*. The most frequently used type of non-text element in Grade 1 was the *Chart*, followed by the *Table*, then the *Bar Graph*.

In Grade 2, *Bar Graphs, Circle Graphs, Charts, and Tables* were used. The number of *Bar Graphs* remained the same from Grade 1 to Grade 2, while the number of *Charts* and *Tables* decreased, and the number of *Circle Graphs* increased. The most frequently used type of non-text element in Grade 2 was the *Chart*. The *Bar Graph, Circle Graph, and Table* were the least used non-text element and each was used twice.

In Grade 3, *Line Graphs*, *Charts*, and *Tables* were used. *Bar Graphs* and *Circle Graphs* were used in Grade 2 but not in Grade 3. The number of *Line Graphs* and *Charts* increased, while the number of *Tables* decreased. The most frequently used type of non-text element in Grade 3 was the *Chart*, followed by the *Line Graph*. The *Table* was the least used non-text element and was only used one time.

In Grade 4, *Bar Graphs*, *Circle Graphs*, *Line Graphs*, and *Charts* were used. The number of *Bar Graphs*, *Circle Graphs*, *Line Graphs*, and *Charts* all increased at Grade 4. *Tables* were used in Grade 3 but not at Grade 4. The most frequently used type of non-text elements in Grade 4 were the *Bar Graph and Chart*, followed by the *Line Graph*. The *Circle Graph* was the least used non-text element and was used only one time.

In Grade 5, *Bar Graphs*, *Circle Graphs*, *Climographs*, *Line Graphs*, *Pictographs*, *Charts*, and *Tables* were used. The most frequently used kind of non-text element was the *Bar Graph*, followed by the *Chart*, *Circle Graph*, *Line Graph*, and the *Climograph*. The *Pictograph* and *Table* were the least used non-text element and each was used once.

In Grade 1-5, the most often-used non-text element was the *Chart*. The second most used non-text element in the Addison Wesley Longman Inc. textbooks was the *Bar Graph*; however, this non-text element was used 14 times at the Grade 5 and only 10 times in Grade 1 through Grade 4 combined. The next most frequently used non-text element was the *Line Graph* followed by the *Circle Graph*, *Table*, and the *Climograph*. The least used non-text element was the *Chart*, which was used one time. The *Population Pyramid* was not used at all in the Addison Wesley Longman Inc. textbooks.

The data gathered for the Houghton Mifflin Harcourt school publishers' textbooks is presented in Figure 5 and Table 7.

As indicated by the data gathered, the overall number of non-text elements in the Houghton Mifflin Harcourt school publishers textbooks increases from first to Grade 2, remained the same between second and Grade 3, and increased each year from third to Grade 5. In Grade 1, 15 non-text elements were examined. Grade 2 and Grade 3 each contained 16 non-text elements. Grade 4 increased to 32 non-text elements, and Grade 5 had a total of 41 non-text elements that were examined.

There were variations at each grade level in the specific type of non-text element used. Four out of the eight types of non-text elements were found at Grade 1. These were *Bar Graphs*, *Pictographs*, *Charts*, and *Tables*. The most frequently used type of non-text element in Grade 1 was the *Chart*, followed by the *Table*, then the *Bar Graph* and *Pictograph*.

In Grade 2, *Bar Graphs*, *Pictographs*, *Charts*, and *Tables* were used. The number of *Bar Graphs* and *Pictographs* remained the same from Grade 1 to Grade 2, while the number of *Charts* increased, and the number of *Tables* decreased. The most frequently used type of non-text element in Grade 2 was the *Chart* followed by the *Table*. The least used non-text elements were the *Bar Graph* and *Pictograph* and each was used twice.

In Grade 3, *Bar Graphs*, *Line Graphs*, *Pictographs*, *Charts*, and *Tables* were used. The number of *Bar Graphs*, *Line Graphs*, and *Charts* increased, while the number of *Pictographs* and *Tables* decreased. The most frequently used type of non-text element in Grade 3 was the *Chart*, followed by the *Bar Graph* then the *Table*. The least used non-text elements were the *Line Graph* and *Pictograph* and each was used one time.

In Grade 4, *Bar Graphs*, *Climographs*, *Line Graphs*, *Pictographs*, *Charts*, and *Tables* were used. The number of all the kinds of non-text elements used in Grade 4 increased. The most frequently used non-text element at Grade 4 was the *Bar Graphs* followed by the *Chart*. The

Pictograph and *Table* were both used five times each, and the *Line Graph* was used four times. The least used non-text element at Grade 4 was the *Climograph*.

In Grade 5, all eight non-text elements examined were used. The most frequently used kind of non-text elements were the *Bar Graph* and the *Chart* which were used 10 times each. The next most frequently used non-text element was the *Line Graph*, then the *Circle Graph*, and *Chart*. The *Pictograph* and *Table* were both used three times, and the *Climograph* was used twice. The *Population Pyramid* was used once, and it was the only time the *Population Pyramid* was used in any textbook by any publisher.

In Grade 1 through 3, the most often-used non-text element was the *Chart*. At Grade 4, the *Bar Graph* was used most frequently and at Grade 5, the *Bar Graph* and *Chart* were used ten times each. The Houghton Mifflin Harcourt school publishers were the only one that used all eight non-text elements examined.

Summary

Of the three publishers examined, Houghton Mifflin Harcourt school publishers contain the most non-text elements overall with 120 elements examined, McGraw-Hill school division contained the second most non-text elements with 102 elements examined, and the Addison Wesley Longman Inc. textbooks contain the fewest non-text elements overall with 79 elements examined.

Discussion of the Results

The types and quantities of graphs, charts, and tables. All of the Texas state-approved textbooks for Social Studies in Grade 1-5 contained graphs, charts, and tables. *Charts* and *Bar Graphs* were consistently the most often used non-text elements. In addition, the overall number of non-text elements increased each year from Grade 1-5. In

Grade 1-4, the non-text element most often used was the Chart. At Grade 5, the non-text element most often used was the *Bar Graph*. The *Population Pyramid* was the least used non-text element at each grade level.

The Houghton Mifflin Harcourt school publishers' textbooks contained the most non-text elements examined by the researcher as well as the most non-text elements at each grade level examined except at Grade 3. The McGraw-Hill school division textbooks contained the second most non-text elements examined by the researcher as well as the most non-text elements examined at Grade 3 contained. Finally, the Addison Wesley Longman Inc. textbooks contained the fewest non-text elements examined at all grade levels.

When one considers the fact that the researcher examined eight different non-text elements at five different grade levels, one would expect the total number of non-text elements to be much higher. The Houghton Mifflin Harcourt school publishers' textbooks, which contained the most non-text elements examined, the non-text elements would break down to an average of approximately 24 items at each grade level and an average of approximately three items for each type of graph, chart, or table if the items were evenly distributed. This gives students very little interaction with the various forms of graphs, charts, and tables each year.

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